

A REVIEW OF THE *SCHINIA REGIA* (STRECKER) SPECIES COMPLEX WITH
A DESCRIPTION OF A NEW SPECIES (NOCTUIDAE: HELIOTHINAE)

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ABSTRACT. *Schinia regia*, new species, is described and illustrated. Diagnostic characters and host plant distributions are compared with *Schinia regia* (Strecker) and *Schinia niveicosta* (Smith). The larval host plant of *Schinia regia*, *Palafoxia sphacelata* (Nutt. ex Torr.) Cory (Asteraceae), is reported for the first time. Genitalic images and descriptions of both sexes are presented for all species.

Additional key words: taxonomy, biology, host plants, Asteraceae.

We are currently working on the Moths of North America fascicle of the Noctuidae subfamily Heliorthinae. Several projects must be resolved before this fascicle can be completed. One project is a phylogeny of the genus *Schinia*. *Schinia* is the most diverse in the subfamily, currently with 112 species (Hardwick 1996). We have discovered taxonomic problems within closely related species or species complexes. These taxonomic problems must be resolved before a phylogeny can be constructed. The most efficient way to treat such a large genus is to define species groups within *Schinia* based on morphological characters within the context of a phylogeny. This paper addresses one of these problems.

Schinia regia (Strecker), *Schinia niveicosta* (Smith), and *Schinia regia*, new species, form a compact group with a white forewing and gray, pinkish-purple, or pink patterns. These color patterns vary within each of these species. *Schinia niveicosta* and *S. regia* larvae feed on two different species in the genus *Palafoxia* (Asteraceae), and *S. regia* larvae feed on *Vernonia texana* (A. Gray) Small (Asteraceae).

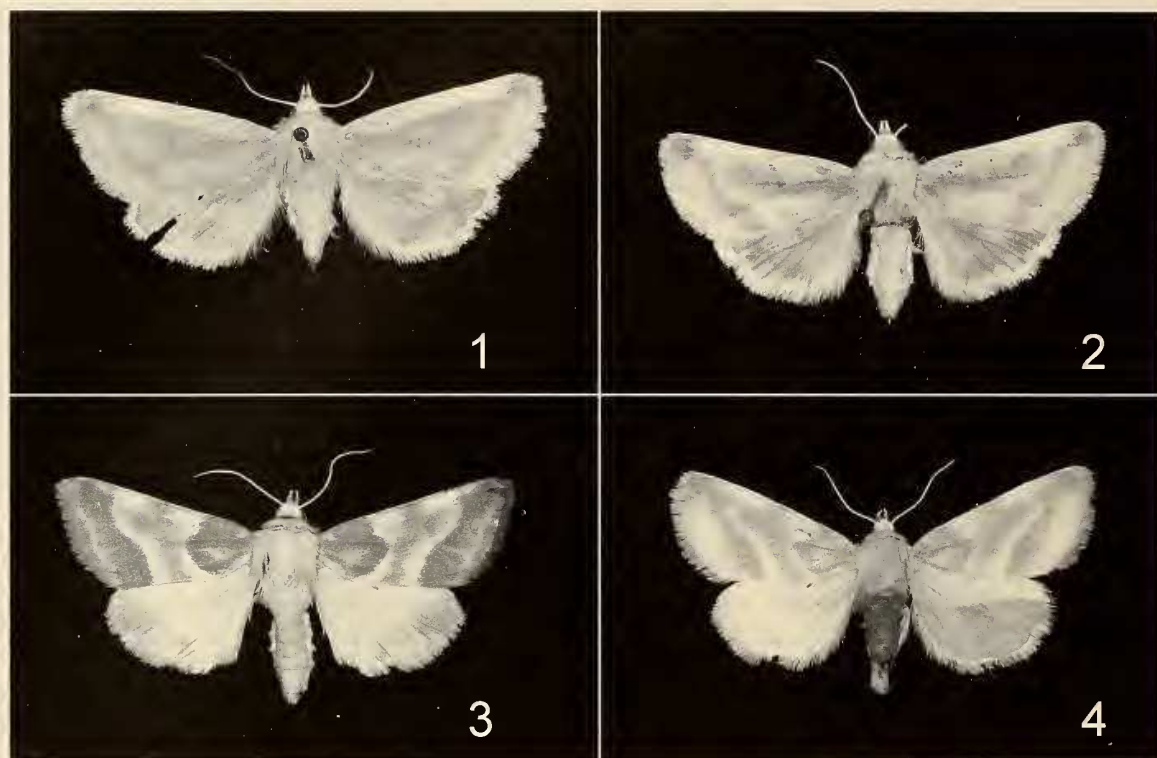
Hardwick's (1996) rearing studies of *S. regia* on *Vernonia texana* did not account for the distribution of the western specimens. A search of collecting localities suggested the use of a sandhills host plant. Other western species of *Vernonia* did not occur at any of these sites, with *Vernonia marginata* preferring a much heavier soil and *V. fasciculata* Michx. not covering the range of the remaining *S. regia* localities. In conducting field work in central Colorado one of us (CEH) discovered females of *regia*-like specimens on *Palafoxia sphacelata* (Nutt. ex Torr.) Cory. Studies of flowerheads yielded larvae that were different from Hardwick's (1996) description of *Vernonia*-feeding *S. regia*. The larvae of *S. regia*

were ivory with a magenta median stripe and in *S. regia* the larvae were mauve with a gray median stripe (Hardwick 1996). This led to speculation about the *Palafoxia* feeder possibly being a new species. When the host plant distribution of *Schinia regia* was plotted, it only corresponded with the moths collected in eastern Texas. When *Palafoxia sphacelata* was plotted, it overlapped the distribution of the *regia*-like specimens. This finding led to further morphological study, and it was determined that the *Palafoxia* feeder was a new species.

MATERIALS AND METHODS

The adult images were taken with a Kodak DSC 315 digital camera. The genitalic images were taken through a Wild Photomakroskop dissecting microscope using a JVC KY-F70B digital camera. The genitalic images were then manipulated with AutoMontage® and Photoshop 6.0®.

We examined material from the following institutions and private collections. The following acronyms of institutions and private collections where material is housed were used: American Museum of Natural History, New York, New York (AMNH); Charles E. Harp, private collection, Littleton, Colorado (CEH); Canadian National Collection, Ottawa, Ontario, Canada (CNC); Chadron State College, Chadron, Nebraska (CSC); Colorado State University, Ft. Collins, Colorado (CSU); Donald J. Wright, private collection, Cincinnati, Ohio (DJW); Edward C. Knudson, private collection, Houston, Texas (ECK); Fort Hays State University, Hays, Kansas (FHSU); Field Museum of Natural History, Chicago, Illinois (FMNH); James K. Adams, private collection, Dalton, Georgia (JKA); Los Angeles County Museum, Los Angeles, California (LACM); Oral Roberts University, Tulsa, Oklahoma



FIGS. 1-4. Adults. 1, *Schinia niveicosta*, ♀ holotype, S. California; 2, *S. niveicosta*, *S. melliflua* [synonym] ♀ holotype, Palm Springs, Riverside Co., California; 3, *S. regia*, ♂, Sinton Welder Wildlife Refuge, San Patricio Co., Texas, USNM ENT 00142624; 4, *S. regina*, ♂ holotype, Canadian, Hemphill Co., Texas, USNM ENT 00142656.

(ORU); Ronald Leuschner, private collection, Manhattan Beach, California (RL); Snow Museum of Entomology, University of Kansas, Lawrence, Kansas (SMEK); Texas A&M University, College Station, Texas (TAMU); University of Nebraska, Lincoln, Nebraska (UNL); National Museum of Natural History, Smithsonian Institution, Washington, District of Columbia (USNM).

SYSTEMATICS

Schinia niveicosta (Smith)
(Figs. 1-2, 5-6, 11, 14)

Heliothis niveicosta Smith 1906:15.

Schinia niveicosta: McDunnough 1938:106; Franclemont and Todd 1983:159; Poole 1989:896; Poole and Gentili 1996:772; Hardwick 1996:161.

Schinia melliflua Dyar 1921:41.

Diagnosis. *Schinia niveicosta* lacks the distinct basal patch in the forewing that is present in *regia* and *regina*. The forewing subterminal band is less distinct and narrower in *niveicosta* than in *regia* and *regina* (Figs. 1-6). Both *niveicosta* and *regina* are *Palafoxia* feeders in the larval stage, but both hosts and moths are allopatric (Fig. 14).

Description. Male: Genitalia (Figs. 5-6): Uncus short (0.30 × valve length), equal width throughout length. Valve moderately elongate (length 6.7 × width), costal margin angulate at approximately two-thirds length; ampulla short (0.05 × valve length); corona present; sacculus well developed and greatly produced. Juxta quadrate, proximal margin curved, sclerotization uniform. Aedoeagus slightly curved, dorsal patch of dense minute spicules; vesica with 2 and one-half coils and minute spicules.

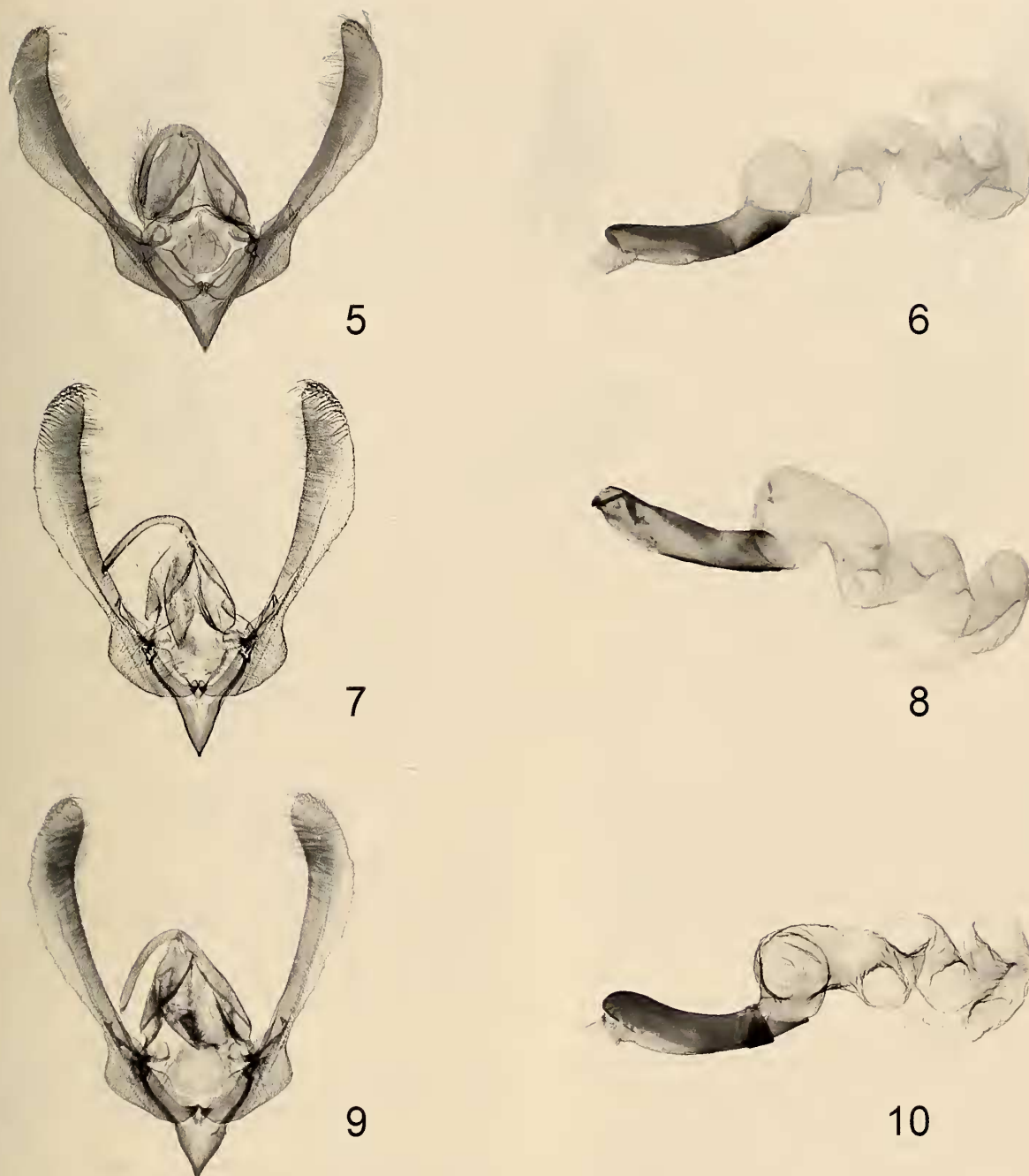
Female: Genitalia (Fig. 11): Papillae anales broadly triangulate, apex pointed; dorsal margin concave. Eighth segment with fine spicules. Distal margins of seventh segment with a double row of medium length setae, distal row longer and more robust than proximal row. Ostium bursa sclerotized with minute spicules. Ductus bursa narrow, approximately 0.2 × length. Appendix bursa coiled. Corpus bursa ovate; signa composed of two scobinate bars.

Type material. *Schinia niveicosta*: Holotype ♀, in USNM, with the following labels: (1) Southern Cala.; (2) *Heliothis niveicosta*, ♀ type, Sm. [Handwritten, red bordered label]; (3) Barnes Collection [printed in red]. *Schinia melliflua*: Holotype ♀, in USNM, with the following labels: (1) Palm Springs, 20-IV-1916, S. Calif., V.L. Clemence [hand written in black ink]; (2) Type No. 23851, U.S.N.M. [red type label]; (3) *Schinia melliflua*, Type Dyar [hand written in black ink].

Type locality. Southern California.

Larval host plant. *Palafoxia linearis* (Cav.) Lag. (Asteraceae).

Flight period. The majority of specimens were collected in March and April. A few specimens have been recorded in May, September to November, and January to February.

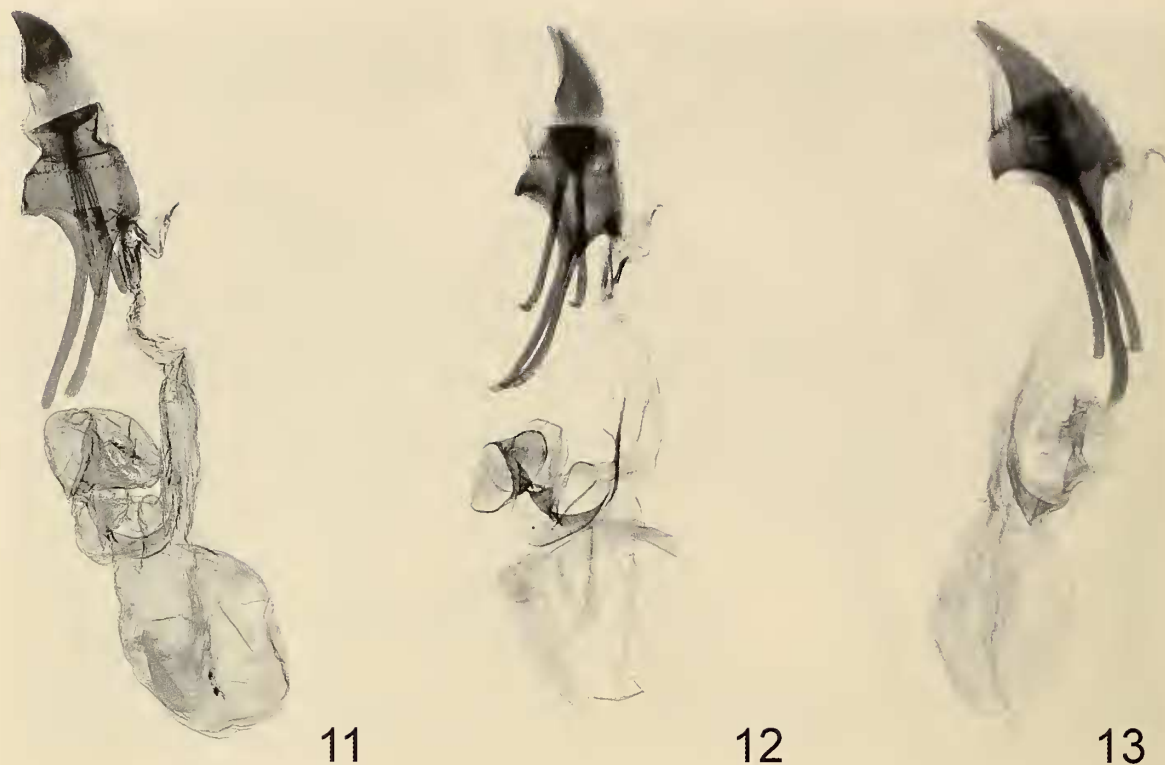


FIGS. 5-10. Male genitalia of *Schinia*. 5, *S. niveicosta*; 6, *S. niveicosta*, aedeagus; 7, *S. regia*; 8, *S. regia*, aedeagus; 9, *S. regina*; 10, *S. regina*, aedeagus.

Distribution (Fig. 14). Southwestern Utah, western and southeastern Arizona, west to southern California and southern Nevada.

Material examined. 83 ♂ and 58 ♀. ARIZONA: La Paz Co., Ehrenburg, 16 Mar. 1940 (2 ♀), 17 Mar. 1940 (2 ♂), Mar. 25 1940 (1 ♂ 1 ♀), F.H. Parker. Yuma Co., Quartzite, 800 ft., 7 Feb. 1977 (1 ♀), J.H. Baker; Wellton, 23 Apr. 1935 (1 ♀); Yuma, 7 Apr. 1935 (2 ♂), 30 Apr. 1935 (1 ♂), G.P. Englehart, 24 Apr. 1949 (1 ♀), D.L. Bauer. CALIFORNIA: Imperial Co., [no specific locality], 13

Mar. 1926 (1 ♂), 15 Mar. (2 ♂ 2 ♀); Dixieland, Spring 1922 (1 ♂ 1 ♀), 1-15 Mar. 1922 (12 ♂ 16 ♀), 1-15 Mar. (9 ♂), 15-30 Mar. 1922 (7 ♂ 5 ♀), 1-15 Apr. 1922 (7 ♂), 15-30 Apr. 1922 (2 ♂ 1 ♀), O.C. Poling, Glamis, 28 Apr. 1998 (10 ♂ 6 ♀), N. Bloomfield. Kern Co., Indian Wells, Colorado Desert, 1 Nov. 1920 (2 ♂ 1 ♀), K.R. Coolidge. Riverside Co., Blythe, 5 Jan. 1941 (1 ♀), 3 Feb. 1940 (1 ♂), F.H. Parker, Cabazon Pass, nr. Banning, 3 Sep. 1951 (1 ♀), F.R. Sala; Coachella, 21 Mar. 1926 (1 ♀); Colorado Desert, Apr. (1 ♂), J.E. Cottle; Indio, 22 Mar. 1942 (1 ♀), 7 Apr. 1942 (1 ♀), 9 Apr. 1942 (1 ♂), 12 Apr. 1942 (1 ♂ 1 ♀), ♂ genitalia slide USNM 46853,



FIGS. 11-13. Female genitalia of *Schinia*. 11, *S. niveicosta*; 12, *S. regia*; 13, *S. regina*.

W.P. Medler, 4 May 1921 (2 ♂), 8 May 1921 (2 ♀), E. Piazza, 29 May (1 ♂), J.H. Baker, Oct. (1 ♂ 1 ♀), 29 Oct. 1923 (1 ♂), 4 Nov. 1923 (2 ♂), 8 Nov. 1923 (2 ♂); Palm Canyon (1 ♂ 1 ♀), J.E. Cottle; Palm Springs, 8-15 Mar. (4 ♂ 1 ♀), 4 Apr. 1934 (1 ♀), 16-23 Apr. (4 ♂ 3 ♀), 3 Nov. 1951 (1 ♀), F.R. Sala; Shaver's Wells, 6 Apr. 1937 (1 ♂), G. Willett, San Diego Co., Borego, 7 Mar. 1940 (1 ♀), 30 Apr. 1952 (1 ♀), G.H. & J.D. Sperry; Borego Valley, 3 Apr. 1941 (1 ♂), 13 Apr. 1941 (1 ♀), ♀ genitalia slide USNM 46854, R.R. McElvare. NEVADA: south, Apr. (1 ♀).

Discussion. The holotype of *niveicosta* has a gray forewing that blends into the slightly darker subterminal band, the costa is gray basally becoming white near its apex, and the apical spot is distinct. The holotype of the synonym *melliflua* has the forewing pattern more distinct with the subterminal band flushed with purplish-pink. The coloration in both the forewing and hindwing of *niveicosta* is variable. The forewing pattern can be gray to pink, with intermediate purplish-pink. The hindwing can have a gray or pinkish marginal band.

There are apparently two broods within the range of *niveicosta*. This species is mainly a spring flyer, with the majority of records in March and April, a few in January and February. There is a partial second brood that flies in October and November. During wet years there may be a second brood. The only years with data for a fall brood were 1920 and 1951.

Schinia regia (Strecker)
(Figs. 3, 7-8, 12, 14)

Heliothis regia Strecker 1876:121.

Schinia regia: Smith 1891:54; Smith 1893:279; McDunnough 1938:106; Franclemont and Todd 1983:159; Poole 1989:896; Poole and Gentili 1996:772; Hardwick 1996:162.

Porrina regia: Dyar 1903:187.

Diagnosis. There are only very subtle differences in the forewing maculation of *regia* and *regina*. These differences are best observed by comparing a good series of both species. The colored areas of the forewing are more pink in *regina* and more purplish in *regia*. These species can be separated by their geographical distributions. *Schinia regia* is found restricted to southern and eastern Texas. Southern Texas counties include Zapata, Jim Hogg, Hidalgo, Cameron, Kenedy, Kleberg, Jim Wells, and San Patricio. *Schinia regina* is more widely distributed from southern Texas north through the panhandle, Oklahoma, Kansas, northwestern Nebraska, and west to southern New Mexico and Colorado east of the continental divide. Southern Texas counties include Webb and La Salle.

Description. Male: Genitalia (Figs. 7–8): Uncus short ($0.30 \times$ valve length), apex slightly wider than base. Valve moderately elongate (length $6.7 \times$ width), costal margin angulate at approximately two-thirds length; ampulla short ($0.03 \times$ valve length); corona present; sacculus well developed and greatly produced. Juxta quadrate, proximal margin slightly concave, sclerotization uniform. Aedoeagus slightly curved, dorsal patch of dense minute spicules; vesica with 2 and one-half coils and minute spicules.

Female: Genitalia (Fig. 12): Papillae anales triangulate, apex pointed; dorsal margin concave. Eighth segment with fine spicules. Distal margins of seventh segment with a double row of elongate setae, distal row longer and more robust than proximal row. Ostium bursa sclerotized with minute spicules. Ductus bursa wide, approximately $0.4 \times$ length. Appendix bursa coiled. Corpus bursa ovate; signa composed of two scobinate bars.

Type material. Holotype ♂, in FMNH.

Type locality. Dallas, Texas.

Larval host plant. *Vernonia texana* (A. Gray) Small (Asteraceae); Texas Ironweed.

Flight period. Majority of specimens were collected from September to mid October, one specimen was recorded in early June.

Material examined. 23 ♂ and 26 ♀. TEXAS: Bastrop Co., Bastrop State Park, 28 Sep. 1964 (1 ♂), A. & M.E. Blanchard. Brazos Co., College Station, Sep. (2 ♂ 7 ♀). Cameron Co., La Feria, 4 Sep. 1967 (1 ♀), 26 Sep. 1963 (1 ♀), 1 ♀ genitalia slide MGP 1144, P.T. Riherd (TAMU). Hidalgo Co., Benston State Park, 20 Oct. 1974 (1 ♂), ♂ genitalia slide USNM 46848, E.C. Knudson; Mercedes, 19 Sep. 1955 (1 ♂), 10 Oct. 1955 (1 ♂), ♂ genitalia slide MGP 1145, P.T. Riherd (TAMU); Santa Ana Refuge, 4 Oct. 1964 (1 ♀), A. & M.E. Blanchard; Weslaco, 30 July 1953 (1 ♀), 1 Sep. 1953 (1 ♂), ♂ genitalia slide MGP 1143, P.T. Riherd (TAMU). Jim Wells Co., Alice, 6 Oct. 1963 (1 ♀), ♀ genitalia slide USNM 46852, A. & M.E. Blanchard. Kenedy Co., Padre Island National Seashore, 24 Sep. 1979 (1 ♂), ♂ genitalia slide USNM 46788, 26 Sep. 1979 (1 ♂ 1 ♀), ♀ genitalia slide USNM 46789, A. & M.E. Blanchard. Kleberg Co., Kingsville (1 ♂ 1 ♀), ♀ genitalia slide USNM 46849, C.T. Reed. San Patricio Co., Lake Corpus Christi State Park, 30 Sep. 1988 (1 ♀), E.C. Knudson; Sinton Welder Wildlife Refuge, 7 Oct. 1963 (2 ♂ 3 ♀), 8 Oct. 1963 (4 ♂ 2 ♀), 11 Oct. 1963 (1 ♀), 12 Oct. 1963 (1 ♂), A. & M.E. Blanchard; Sinton, Wildlife Refuge, 21 Sep. 1984 (1 ♂), 25 Sep. 1984 (1 ♂ 1 ♀), 28 Sep. 1984 (1 ♂), 2 Oct. 1984 (2 ♂ 1 ♀), D.F. Hardwick (CNC). Webb Co., Laredo, 25 Aug. 1926 (1 ♂). Zapata Co., Zapata, 4 June 1964 (1 ♀), ♀ genitalia slide USNM 46851, 18 Sep. 1973 (1 ♂ 1 ♀), A. & M.E. Blanchard.

Distribution (Fig. 14). Eastern Texas, south to include San Patricio, Jim Wells, Kleberg, Kenedy, Cameron, Hidalgo, Jim Hogg, Starr, and Zapata counties.

Discussion. *Schinia regia* has a single brood in the fall with collection dates throughout September to mid October. There is a single female from Zapata, Texas that was collected in June. This could be evidence of a partial second brood, but more field work at this time of year is needed to confirm this record.

The colored areas of the forewing are usually purplish-pink, but some specimens can have more pink with less of a purplish cast. The median area, between the colored areas, is white with a broad light brown band. This band can vary in intensity and width.

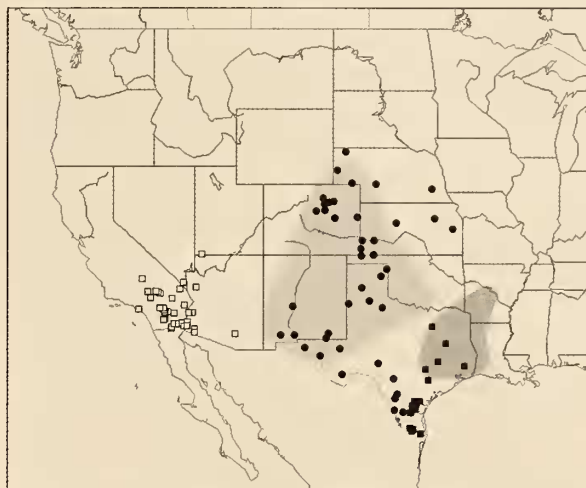


FIG. 14. Collecting localities and larval hostplant distribution of *Schinia* (open squares = *S. niveicosta*; solid squares = *S. regia*; solid circles = *S. regina*) (dark gray area = *Vernonia texana*, larval hostplant of *S. regia*, and light gray area = *Palafoxia sphacelata*, larval hostplant of *S. regina*).

Schinia regia Pogue and Harp, new species (Figs. 4, 9–10, 13–14)

Diagnosis. The valve of the male genitalia is narrower and the costal margin is more gently curved in *regina*, while in *regia* the valve is wider and the costal margin is distinctly angulate at two-thirds length of valve. The juxta in *regina* has a slightly produced ventral margin which is heavily sclerotized and forms a distinct bar. In *regia* the ventral margin is slightly concave and is uniformly sclerotized. The spiculae on the dorsal patch of the aedoeagus are longer in *regina* than in *regia*. The ductus bursa of the female genitalia is twice the width in *regia* than in *regina* and the scobinate bars in the corpus bursa are slightly wider in *regina* than in *regia*.

Description. Male: Head: Vertex white, frons bulbous, ventral lip not produced, white. Labial palp white. Antenna filiform, scape and dorsal scales white. **Thorax:** Patagium, tegula, meso- and metathorax white. Venter white. Foreleg with femur darker medially, cream to gray, lighter laterally, cream to white; tibia longer than basitarsus, white, inner side with one large and 3 progressively smaller spines, outer side with 2 large and 2 smaller spines; tarsi white. Middle and hind legs white, some specimens can have pink on tibia and tarsi. **Forewing:** Male length 12–14.5 mm (N = 10). Basal patch pink to pink with a slight purplish cast; median area white with a broad light brown band; subterminal band pink to pink with a slight purplish cast; terminal area white tending to cream to light brown at margin; fringe cream to light brown. **Hindwing:** Ground color white; marginal band intensity and color variable, absent to moderately developed and pink to a mixture of pink and light gray. **Abdomen:** Cream with small brown spots laterally. **Genitalia** (Figs. 9–10): Uncus short ($0.30 \times$ valve length), robust. Valve elongate (length $8.3 \times$ width), costal margin gently curved; ampulla minute ($0.015 \times$ valve length); corona present; sacculus well developed and greatly produced. Juxta quadrate, proximal margin slightly produced, heavily sclerotized, forming a distinct bar along margin. Aedoeagus slightly curved, dorsal patch of dense minute spicules; vesica with 2 and one-half coils and minute spicules.

Female. As in male except forewing length 13–16 mm (N = 12). **Genitalia** (Fig. 13): Papillae anales triangulate, apex pointed; dorsal margin concave. Eighth segment with fine spicules. Distal margins of seventh segment with a double row of elongate setae, distal row longer and more robust than proximal row. Ostium bursa lightly sclerotized, minute spicules present. Ductus bursa narrow, approximately 0.2 × length. Appendix bursa coiled. Corpus bursa ovate; signa composed of two scobinate bars.

Types. **Holotype:** ♂, in USNM, with the following labels: (1) Candian, Hemphill Co., Texas; 15 VIII 71; A. & M. Blanchard; (2) USNM ENT 00142656 [bar code label]; (3) Holotype ♂, *Schinia regina* Pogue and Harp. **Paratypes.** 47 ♂, 53 ♀, all in USNM unless noted. **COLORADO:** No specific locality (1 ♂ 1 ♀), Bruce [collector] (USNM ENT 143145-6); (1 ♀), Oslar (USNM ENT 143147). Adams Co., E of Bennett, 39.74°N, 104.41°W, 21 Aug. 1999 (1 ♂) C.E. Harp (CEH). Arapahoe Co., S of Manilla, 39.74°N, 104.52°W, 21 Aug. 1999 (1 ♂), C.E. Harp (CEH). Baca Co., Picture Canyon, picnic area, Comanche National Grassland, sw of Campo, UV trap, 37°00.66'N, 102°44.64'W, 25 Aug. 2002 (3 ♂ 1 ♀), M.G. Pogue & C.E. Harp. (USNM ENT 14410-3); Picture Canyon, n. of picnic area, Comanche National Grassland, sw of Campo, at mv light, 37°01.41'N, 102°44.65'W, 25 Aug. 2002 (7 ♂ 1 ♀), M.G. Pogue & C.E. Harp. (USNM ENT 144459-66); Picture Canyon, Comanche National Grassland, sw of Campo, at mv light, 37°00.72'N, 102°44.60'W, 29 Aug. 2002 (2 ♂), C.E. Harp (CEH); Picture Canyon, Comanche National Grassland, sw of Campo, at UV light, 37°00.66'N, 102°44.60'W, 29 Aug. 2002 (1 ♂), C.E. Harp (CEH); Springfield, s. End of town, along Hwy #385/287 at truckstop lights, 37°23.10'N, 102°36.92'W, 28 Aug. 2002 (3 ♂ 1 ♀), C.E. Harp (CEH). Cheyenne Co., 2 mi e. of Aroya, Hwy. #94 at rd. T and rd. O, 38°50.98'N, 103°09.79'W, 28 Aug. 2002 (3 ♂ 1 ♀), C.E. Harp (CEH). Fremont Co., Penrose, 38.42°N, 105.02°W, 17 Aug. 2001 (2 ♀) 24 Aug. 2001 (1 ♂ 1 ♀), C.E. Harp (CEH). Jefferson Co., Morrison, June (2 ♂), Park, (USNM ENT 143165-6). Lincoln Co., Limon, 39.27°N, 103.71°W, 19 Aug. 1998 (1 ♀), C.E. Harp (CEH). Morgan Co., Wiggins, 40.23°N, 104.07°W, 9 Aug. 2000 (1 ♂ 2 ♀), C.E. Harp (CEH). Otero Co., Vogel Canyon Picnic Area, 15 mi S of La Junta, 4340 ft., 37°46'13"N, 103°30'46"W, 18 Aug. 1997 (1 ♂), D.J. Wright (DJW); Comanche NG, 15 mi S La Junta, 27 Aug. 2000 (1 ♀), D.J. Wright (DJW). Prowers Co., Holly, 38.05°N, 102.12°W, 25 Aug. 2000 (3 ♂ 4 ♀), C.E. Harp (CEH). Pueblo Co., Pueblo West, 38.32°N, 104.74°W, 24 Aug. 2001 (2 ♂ 2 ♀), C.E. Harp (CEH). Weld Co., Roggen, 40.17°N, 104.37°W, 9 Aug. 1999 (1 ♂), 29 Aug. 1999 (1 ♂), C.E. Harp (CEH); E of Roggen, 40.22°N, 104.21°W, 22 Aug. 2001 (1 ♂), C.E. Harp (CEH); Keenesburg, 40.11°N, 104.52°W, 9 Aug. 2000 (1 ♂ 1 ♀), 16 Aug. 2000 (1 ♀), C.E. Harp (CEH). **KANSAS:** No specific locality (1 ♂), (USNM ENT 143148). Ellis Co., Hays, 6 Sep. 1935 (1 ♀), H.K. Walkden, (USNM ENT 143151). Finney Co., Garden City, 30 Aug. 1935 (1 ♀), H.K. Walkden, (USNM ENT 143150). Morton Co., Cimarron NG, 7.5 mi N of Elkhart, 25 Aug. 2000 (2 ♀), 26 Aug. 2000 (2 ♀), D.J. Wright (DJW). Riley Co., Manhattan, 1 Sep. 1937 (1 ♂), H.K. Walkden, (USNM ENT 143149). **NEBRASKA:** Daves Co., Chadron, 42.83°N, 103.02°W, 26 July 1976 (1 ♂), H.R. Lawson (CSC). Scotts Bluff Co., Scottsbluff, 5 Aug. (1 ♂), ♂ genitalia slide USNM 46786, 12 Aug. (1 ♀), 13 Aug. (2 ♀), Whelan, 14 Aug. (1 ♀), (USNM ENT 143152-6). **NEW MEXICO:** Eddy Co., Campsite, 31°21.4'N, 103°46.9'W, 13 June 1979 (1 ♀), 19 June 1979 (1 ♀), D.R. Delorme & H. L. Carrola, (USNM ENT 143416-7) (TAMU); White[s] City, 18 Sep. 1963 (4 ♀), 22 Sep. 1962 (1 ♂), A. & E. Blanchard, (USNM ENT 143158, 143161-4). Luna Co., Deming, 1–7 Sep. (1 ♂ 2 ♀), ♀ genitalia slide USNM 46787, (USNM ENT 143157-60). **OKLAHOMA:** Cimarron Co., nw. of Black Mesa State Park, roadside along Gallinas Canyon, 36°57.72'N, 102°48.52'W, 29 Aug. 2002 (4 ♀), C.E. Harp (CEH). **TEXAS:** Brewster Co., 15–30 Aug. 1926 (1 ♂), O.C. Poling, (USNM ENT 142637). Cottle Co., Paducah, 19 Aug. 1971 (3 ♂), A. & E. Blanchard, (USNM ENT 142653-5). Hemphill Co., Canadian, 15 Aug. 1971 (1 ♂ 1 ♀), A. & E. Blanchard, (USNM ENT 142656-8). La Salle Co., Artesia Wells, 28 Sep. 1971 (1 ♂ 3 ♀), ♂ genitalia slide USNM 46850, (USNM ENT 142646-9); Chaparral Wildlife Management Area,

29–30 Sep. 1959 (1 ♀), J. Schaffner, (USNM ENT 143413) (TAMU). Reeves Co., Pecos, 18 Sep. 1952 (5 ♀), R. Leuschner, (USNM ENT 142638-42). Ward Co., Monahans Sandhill State Park, Monahans, 20 Sep. 1999 (1 ♂), J.B. Lombardini, (USNM ENT 143415) (TAMU). Webb Co., Laredo, 25 Aug. 1926 (1 ♂), (USNM ENT 142615).

Additional material examined. **COLORADO:** Morgan Co., SSW of Ft. Morgan, 40.23°N, 103.80°W, 16 Aug. 1990, M.D. Bowers (JKA). Weld Co., No specific locality, 40.43°N, 104.72°W, P.A. Opler (CSU); **KANSAS:** Ellis Co., No specific locality, 38.88°N, 99.33°W, 6 Sep. 1935, H.H. Walkden (SMEK). Finney Co., No specific locality, 37.95°N, 100.90°W, 4 Sep. 1935, H.H. Walkden (SMEK). Franklin Co., No specific locality, 38.58°N, 95.27°W, (FHSU). Morton Co., No specific locality, 37.02°N, 101.92°W, (FHSU). Seward Co., No specific locality, 37.05°N, 100.93°W, (FHSU). Sherman Co., E of Kanorado, 39.32°N, 102.05°W, 1 Sep. 1995, James K. Adams (JKA). Stanton Co., No specific locality, 37.53°N, 101.88°W, (FHSU). **NEBRASKA:** Deuel Co., No specific locality, 41.10°N, 102.48°W, R. Leuschner (RL). Lancaster Co., No specific locality, 40.82°N, 96.68°W, (UNL). Lincoln Co., No specific locality, 41.15°N, 100.75°W, (UNL). Scotts Bluff Co., Scotts Bluff, 41.87°N, 103.67°W, 30 Sep. 1935, H.H. Walkden (FHSU). **NEW MEXICO:** Doña Ana Co., Las Cruces, 32.30°N, 106.78°W, 12 Sep. 1994, J.K. Adams (JKA). Socorro Co., No specific locality, 34.07°N, 106.92°W, (LACM). **OKLAHOMA:** Ellis Co., No specific locality, 36.27°N, 99.92°W, (ORU). **TEXAS:** Bailey Co., No specific locality, 34.23°N, 102.73°W, (AMNH). Briscoe Co., Caprock Canyon State Park, 34.47°N, 101.30°W, 29 Sep. 1994, E. Knudson (ECK). Cullbertson Co., No specific locality, 31.05°N, 104.85°W, (ECK). El Paso Co., Fabens, 31.43°N, 106.13°W, 7 Sep. 1997 (JKA). La Salle Co., No specific locality, 28.45°N, 99.25°W, (AMNH). Reeves Co., No specific locality, 31.42°N, 103.50°W, (RL). Sutton Co., No specific locality, 30.57°N, 100.65°W. Uvalde Co., Concan, 29.48°N, 99.44°W, (JKA).

Larval foodplant. *Palafoxia sphacelata* (Nutt. ex Torr.) Cory (Asteraceae).

Flight period. The main flight is from mid August to the end of September with a few specimens from mid June.

Distribution (Fig. 14). From southern and western Texas north to the panhandle, northwestern Oklahoma, Kansas, and Nebraska and west to southern New Mexico and eastern Colorado.

Discussion. *Schinia regina* is known to have a single brood, flying from early August through September in the northern parts of its range and during September in the south. There is a record of a June specimen, indicating a partial second brood in some localities. The peak flight of *S. regina* is the end of August with a peak of early October for *S. regia*. Both species overlap in flight period during September.

Although adults are readily taken at lights in proximity to their host plants, they may be seen resting across the tops of the flowerheads of *Palafoxia* during the early to mid-morning hours. Eggs are laid in pre-bloom flowers. Early instar larvae feed within the long, narrow flowerhead. Their presence can be seen as the larvae continue to feed on the early seed parts. This feeding causes the maturing flowers to pull apart basally and start to squeeze up through the top of the flower. This unique appearance in still young flowerheads is indicative of the

internal feeding larva. Only the latter instar larvae feed on the outside of the flowerheads at night and early morning, holding on to the stem just below the calyx and feeding outside through the of the bottom of the flower into the maturing seeds and flower parts.

Forewing coloration can vary from pink to purplish pink, which is about the same color as in *regia*.

Etymology. The species epithet is latin and refers to a queen. This reflects a relationship with the specific epithet of *Schinia regia* meaning royal.

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